

## CLAIMS

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1. An in-line early enhancement generation system comprising:  
 one or more microphones positioned close to one or more sound sources so  
 as to detect predominantly direct sound;  
 an early reflection generation stage which generates a number of delayed  
 reproductions of the microphone signals and which has unitary power gain  
 whereby the stability of the system is independent of the delay times and  
 amplitudes;  
 a number of loudspeakers placed to broadcast said early reflected energy  
 into the room.
2. An in-line early reflection enhancement system according to claim 1  
 wherein the early reflection generation stage also includes at least one cross  
 coupling matrix.
3. An in-line early reflection enhancement system according to claim 1  
 wherein the early reflection generation stage includes a series connection of  
 two or more cross-coupling matrices with a set of delay lines positioned  
 between the two matrices.
4. An in-line early reflection generation system according to claim 2 or claim 3  
 wherein said cross-coupling matrix or matrices are orthonormal matrices.
5. An in-line early reflection generation system according to claim 1 wherein  
 each input is coupled to every output to provide a maximisation of diffusion  
 of the input signals to all of the outputs.
6. An in-line early reflection enhancement system according to any one of  
 claims 1 to 5 in combination with a wideband non-in-line assisted  
 reverberation system which increases apparent room volume, including  
 multiple loudspeakers to broadcast sound into the room, and a  
 reverberation matrix connecting a similar bandwidth signal from each  
 microphone through one or more reverberators having an impulse response  
 consisting of a number of echoes the density of which increases over time,  
 to one or more loudspeakers.

7. An in-line early reflection enhancement system according to claim 6 wherein in said wideband non-in-line assisted reverberation system the reverberation matrix connects a similar bandwidth signal from each microphone through one or more reverberators to at least two loudspeakers each of which receives a signal comprising a sum of at least two reverberated microphone signals.
8. A method for enhancing the acoustics of a room or auditorium comprising detecting predominantly direct sound with one or more microphones positioned close to one or more sound sources, generating a number of delayed reproductions of the microphone signals in an early reflection generation stage and which has unitary power gain whereby the stability of the system is independent of the delay times and amplitudes, and broadcasting said early reflected energy into the room.
9. A method according to claim 8 wherein the early reflection generation stage includes at least one cross coupling matrix.
10. A method according to claim 8 wherein the early reflection generation stage includes a series connection of two or more cross-coupling matrices with a set of delay lines position between the two matrices.
11. A method according to claim 9 or claim 10 wherein said cross-coupling matrix or matrices are orthonormal matrices.
12. A method according to claim 8 wherein each input is coupled to every output to provide a maximisation of diffusion of the input signals to all of the outputs.

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